**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
NATIONAL MARINE FISHERIES SERVICE
Northwest and Alaska Fisheries Center
Division of Resource Assessment and
Conservation Engineering
2725 Montlake Boulevard East
Seattle, Washington 98112

November 28, 1980

CRUISE RESULTS

Eastern Bering Sea Crab/Groundfish Survey

Cruise No. OR-80-02 NOAA R/V Oregon
Cruise No. OH-80-01 M/V Ocean Harvester

May-July 1980

## Cruise Period

R/V Oregon -- May 5 - July 15
Chartered M/V Ocean Harvester -- May 9 - July 26

## Itinerary

The Oregon departed Seattle May 5 and returned to Kodiak on July 15 upon the completion of her scheduled portion of the 1980 Eastern Bering Sea crab/groundfish survey. Intervening port calls were made in Kodiak on May 19 and Dutch Harbor on June 2 and June 24 to pick up equipment and to exchange scientific personnel. One additional port call was made on June 17 to St. Paul Island to seek medical attention for an injured member of the field party.

The M/V Ocean Harvester began its charter in Dutch Harbor on May 9. Subsequent in-port calls to Dutch Harbor were made on May 31 and June 25 to exchange the scientific complement and to take on water and supplies. One other port call was made to Dutch Harbor on May 29 to obtain replacement parts for the vessel's malfunctioning salt water pump.

## Area Surveyed

The survey region of the Bering Sea extended from approximately 60°N and 175°W, south along the 100-fathom contour to Unimak Pass, and east to the mainland (Figure 1).

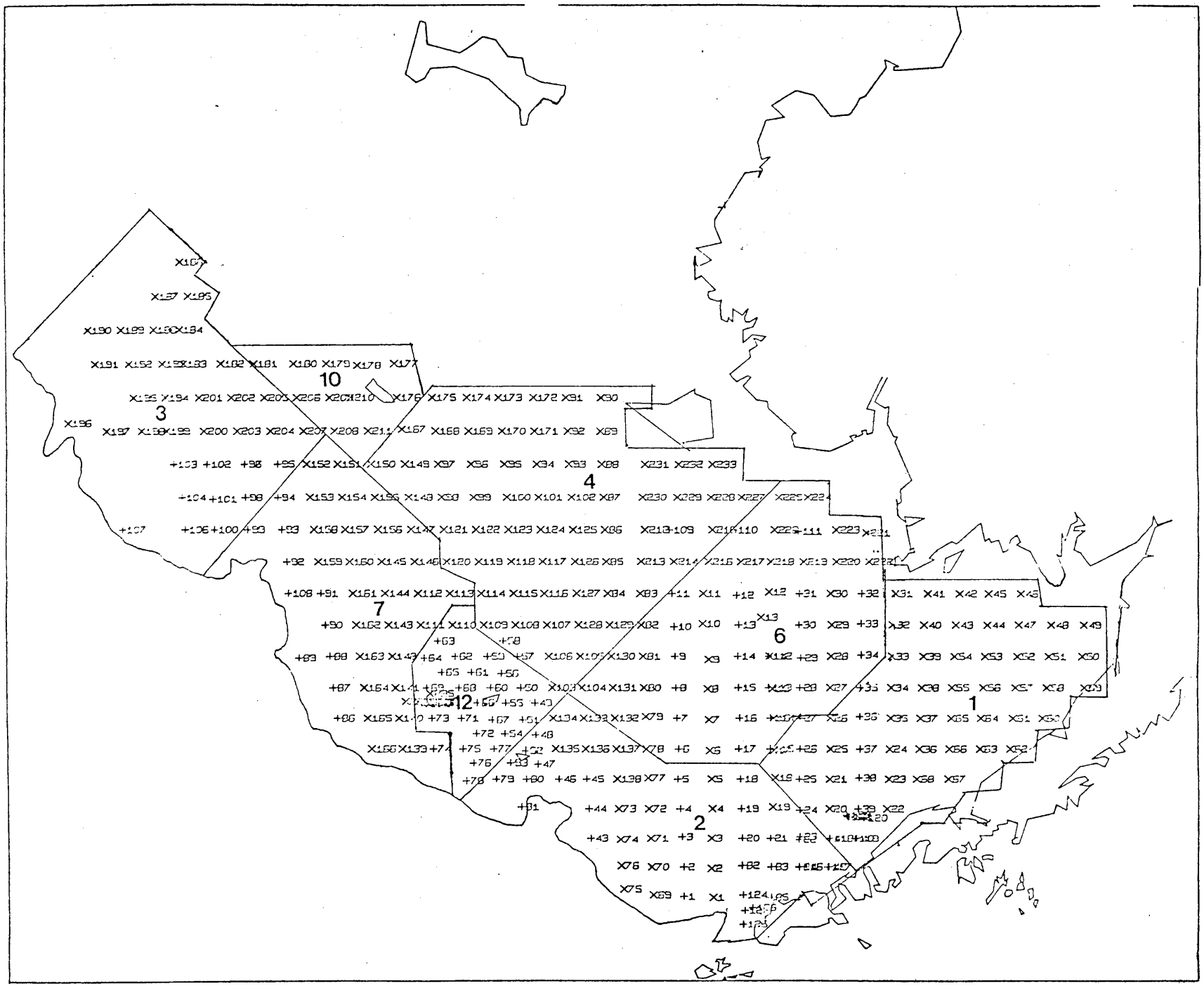


Figure 1. -- Trawling positions by haul numbers, conducted during the 1980 eastern Bering Sea crab/groundfish survey (+ indicates positions of R/V Oregon; X indicates trawling locations of M/V Ocean Harvester)

## Methods

The survey area was designed and delineated, as in previous years, to comprehensively assess the crab and groundfish resources of the eastern Bering Sea. This study region encompasses the major distributional area of commercially important demersal fish and shellfish stocks. Trawling stations were uniformly established on the basis of the standard 20 x 20 mile grid (1 station per 400 square nautical miles) that has been used in earlier Bering Sea surveys. Two age structure collection areas (southeast and northwest) were defined to examine differences in year class and growth rates of selected fish species by region.

A 30-minute demersal trawl haul was conducted at each scheduled station and an attempt was made to maintain a constant towing speed of 3 knots. Catches weighing less than approximately 2500 pounds were entirely sorted and processed. Catches weighing more than the 2500-pound capacity of the sorting table were subsampled. Commercially important crab species were completely removed from every catch. After the catch or subsampled portion of the catch was sorted into baskets, all species or species groups were weighed, enumerated, and either discarded overboard or saved for further processing.

Additional biological data collected on fish species of interest included size frequencies by sex and the collection of age structures. These species included:

Pollock (Theragra chalcogramma)
Yellowfin sole (Limanda aspera)
Rock sole (Lepidopsetta bilineata)
Pacific halibut (Hippoglossus stenolepis)
Pacific cod (Gadus macrocephalus)
Sablefish (Anaplopoma fimbria)
Pacific ocean perch (Sebastes alutus)
Arrowtooth flounder (Ateresthes stomias)
Alaska plaice (Pleuronectes quadrituberculatus)
Greenland turbot (Reinhardtius hippoglossoides)
Flathead sole (Hippoglossoides stenolepis)

Total weights and numbers were determined for king and Tanner crab. All individuals were measured when the crab catch was small. A representative subsample, or approximately 300 crabs, was processed from very large crab catches. In addition to carapace measurements, shell condition, clutch size, and egg condition were also recorded. Tanner crabs were examined for the presence of "black mat" disease.

The M/V Ocean Harvester and the Japanese Fisheries Agency R/V Wakatake Maru conducted 5 days of comparative trawling experiments to study absolute catchability coefficients. The ATA (Alternate Tail Attack) method was used in which one vessel towed directly along the trawl path of the other. The lead position was alternated between vessels, and tows were 30 minutes in duration. At the completion of each tow, the catch was hauled aboard, sorted, weighed, and enumerated. Biological data such as size measurements for selected fish and crab species were also recorded for subsequent analysis.

Table 2.--Age structures[1/] taken by area during the 1980 eastern Bering Sea crab/groundfish survey.

| Species | Age structures taken by area | | Total |
|---|---|---|---|
| | NW Area | SE Area | |
| Pollock | 1,041 | 851 | 1,892 |
| Arrowtooth flounder | 222 | 276 | 498 |
| Yellowfin sole | 380 | 478 | 858 |
| Rock sole | 256 | 160 | 416 |
| Sablefish | -- | 44 | 44 |
| Pacific cod | 746 | 721 | 1,467 |
| TOTAL | 2,645 | 2,530 | 5,175 |

1/ Scales were taken from Pacific cod and otoliths were taken from all other species.

Table 3.--Rank order of abundance of the 20 most abundant fish and invertebrate taxa in the eastern Bering Sea during May-July, 1980.

| Rank | Taxon | CPUE (kg/ha)[1/] |
|---|---|---|
| 1 | Yellowfin sole | 40.9 |
| 2 | Walleye pollock | 31.2 |
| 3 | Pacific cod | 19.1 |
| 4 | Tanner crab (C. opilio) | 12.8 |
| 5 | Starfish (unidentified) | 8.8 |
| 6 | Alaska plaice | 7.5 |
| 7 | Rock sole | 6.1 |
| 8 | Red king crab | 4.6 |
| 9 | Tanner crab (C. bairdi) | 4.5 |
| 10 | Wattled eelpout | 4.4 |
| 11 | Invertebrate (unidentified) | 4.2 |
| 12 | Greenland turbot | 3.7 |
| 13 | Blue king crab | 3.6 |
| 14 | Flathead sole | 2.7 |
| 15 | Purple-orange sea star | 2.6 |
| 16 | Hermit crab | 1.8 |
| 17 | Shortfin eelpout | 1.7 |
| 18 | Skate (unidentified) | 1.5 |
| 19 | Plain sculpin | 1.1 |
| 20 | Longhead dab | 1.0 |

1/ Overall catch per unit effort, kg/ha trawled. Total effort = 1107.8 ha.

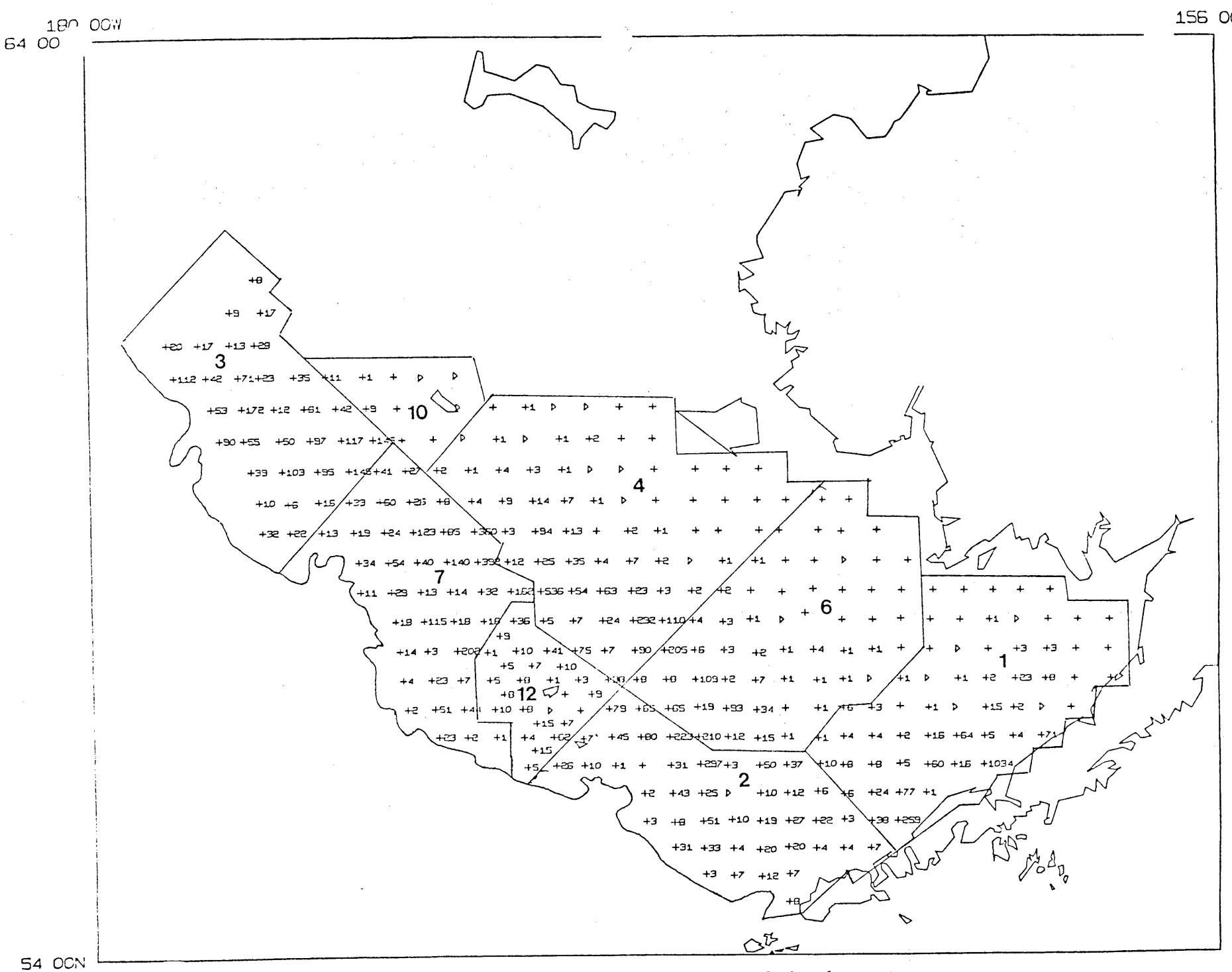


Figure 3. --.Distribution and relative abundance of walleye pollock in the eastern Bering Sea during May-July, 1980 (catch in kg/ha).

Personnel

R/V Oregon
Vessel Captain - Perry Buholm

| Leg | Field Party Chief | Other Personnel | |
|---|---|---|---|
| 1. | Robert Otto (Kodiak) | Jim Stark | (Seattle |
| | | Betty Goetz | (Seattle) |
| | | Lee Ann Gardner | (Kodiak) |
| 2. | Doynne Kessler (Kodiak) | Allen Shimada | (Seattle) |
| | | Jeff June | (Seattle) |
| | | Bill Albers | (Kodiak) |
| 3. | Robert Otto | Solomon Sears | (Seattle) |
| | | Ken Weinberg | (Seattle) |
| | | Steve Bouck | (Seattle) |

M/V Ocean Harvester
Vessel Captains - Oluf Vedoy and John Storoy

| Leg | Field Party Chief | Other Personnel | |
|---|---|---|---|
| 1. | Robert Wolotira (Kodiak) | Terry Sample | (Seattle) |
| | | Yuko Umeda | (Seattle) |
| | | Jim Long | (Seattle) |
| | | Rick Judd | (Kodiak) |
| 2. | Paul Raymore (Seattle) | Rob Loghry | (Seattle) |
| | | Doug Knechtel | (Seattle) |
| | | John Bowerman | (Kodiak) |
| | | Chris Yolk | (U. of W.) |
| 3. | Richard MacIntosh (Kodiak) | Terry Sample | (Seattle) |
| | | Lynn Pokryfki | (Seattle) |
| | | Bob Morrow | (Seattle) |
| | | Franklin Hartsock | (Kodiak) |